Psychology 610 Fall 2004
Prof. Moore Exam 1

ID# _____
(DO NOT put your name)

1. Ima Student is supposed to give a brown bag presentation in two days. Unfortunately, her computer just crashed, and she never saved a back-up copy of her analyses on CD. Fortunately, she found some notes that she made about her data. She has the group means and standard deviations in her notes (M_1=16, SD_1=4; M_2=12, SD_2=4; M_3=4, SD_3=2; M_4 = 10, SD_4=2). She also remembers that she had exactly 10 participants in each condition.

   a. (30 points) Using the known information above, fill in the ANOVA table.

Source	df	SS	MS	F
Mean				
A				
S/A				
Real Total				

b. (25 points) Ima's study investigated the influence of set size on preschool children's counting performance. Ima predicted a negative linear relationship between counting performance and set size. To test her prediction, she randomly assigned 3-year-old children to one of four conditions in which they counted sets of items. The conditions differed according to the number of items in each set—2, 4, 10, or 20 items respectively. Children in all conditions counted 25 sets in total. The dependent measure was the number of correctly counted sets out of 25. Construct the contrast that Ima should use to test her prediction, and calculate the SS for the contrast (you do not need to calculate MS or F).

c. (5 points) Describe how could Ima test for a nonlinear relationship between set size and counting performance.

d. (5 points) Explain how Ima could tell whether the negative linear relationship accounts for most of the variance due to set size.

e. (10 points) Write the linear model for the design, and explain the meaning of each term.

2. Professor Buddy is interested in the effects of social support on illness. He hypothesizes that individuals who report having high social support will get fewer colds than individuals who report low social support. To test his hypothesis, he administers a perceived social support questionnaire to 15 people. He then categorizes people into three conditions based on their perceived level of social support: high social support, medium social support, and low social support. He follows the people longitudinally and records the total number of colds each person gets in one year. The data are listed below. To save you time, some preliminary calculations have been done. [Y] = 145. T = 45.

High Social Support	Medium Social Support	Low Social Support
4	4	3
3	4	2
3	4	2
2	3	2
4	3	2
$\bar{Y}_j =$ 3.2	3.6	2.2

a. (15 points) Construct a contrast to test whether high social support differs from low social support. Calculate the F-value for the contrast, and interpret your results.

b. (15 points) Make a 95% confidence interval for the contrast in (a) using the Tukey method. Then use the confidence interval to test whether medium social support differs significantly from low social support. Interpret your results.

c. (10 points) Describe (don't calculate) how the confidence interval would change if you made a 90% confidence interval. Relate the changes to Type I error and statistical power.

d. (5 points) What are the advantages to using a confidence interval instead of a significance test alone?

3. (4 points each) Describe the conceptual meaning of each of the following terms:

   a. $\alpha_{FW} = .10$

   b. p = .001

   c. table F, or $F^{*}_{\alpha=.05}(1,20) = 4.35$

   d. $MS_{S/A}$

4. (10 points) Name and describe two of the assumptions that are needed for analysis of variance. Also, which of the two assumptions has more serious effects when it is violated?